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Nutrients content and *in vitro* digestibility of ex-food as feed ingredient for pig diets

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Ex-food or Former Food Products (FFPs) represent a way by which losses from the food industry are converted into ingredients for the feed industry, thereby keeping food losses in the food chain. FFPs have been proposed as promising alternative feed ingredients. However, FFPs nutritional potential is not yet fully exploited. The aim of the present study was to perform a nutritional evaluation of selected FFPs.

Six samples of mixed FFPs, all based on bakery products, were analysed for Dry matter (DM), Crude Protein (CP), Ether Extract (EE), Crude Fibre (CF), Neutral Detergent Fiber (NDF), Acid Detergent Fiber (ADF), starch and ash. Nitrogen-Free Extractives (NFE) and Non-Structural Carbohydrate (NSC) were also calculated. Based on FFPs proximate analysis, Digestible Energy (DE) and Metabolizable Energy (ME) values for pigs were calculated. *In vitro* digestibility (IVD) of FFPs were evaluated using a multi-step enzymatic technique to predict the apparent total tract digestibility in pig. A wheat sample was included as control feed ingredient in the study. Data were analysed using IBM SPSS Statistics version 21 software (SPSS Inc.). *In vitro* digestibility values for FFPs samples were analysed using one-way analysis of variance in order to compare means.

FFPs have shown a nutrient composition comparable to that of cereal grains. In the tested FFPs dry matter concentrations ranged from 912.8 g kg^{-1} to 937.6 g kg^{-1}. The overall mean of CP content was 100 g kg^{-1} DM. Compared to wheat, FFPs were characterised by a relative high fat content (average EE 101.2 g kg^{-1} DM). The average starch content was 523.6 g kg^{-1} DM. Nitrogen-free extractives ranged from 611.7 g kg^{-1} DM to 746.8 g kg^{-1} DM, whereas NSC ranged from 585.4 g kg^{-1} DM to 792.7 g kg^{-1} DM. The relatively high NFE, NSC, starch and fat concentrations designated FFPs as valuable energy sources for pig. FFPs tested were characterized by valuable DE (17.2 MJ/kg) and ME (16.9 MJ/kg) values for pigs. However, DE and ME systems used may under/overestimate energy values due to the high lipid and starch content of FFPs. The average IVD value of FFPs samples (88.1% ± 5.77) was comparable to IVD of wheat (90.6% ± 1.62).

In conclusion, FFPs can be considered a fat-fortified version of common cereals grains. The high-energy content and digestibility values elect FFPs as promising non-traditional ingredients for target animals as pig.

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Impact of increasing levels of condensed tannins from sainfoin in grower-finisher diets of entire male pigs on growth performance and carcass characteristics

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Diets containing condensed tannins (CT) have been reported to have anti-nutritional effects in monogastric animals as they reduce feed intake, growth rate and feed efficiency. However, recent findings suggested that hydrolysable tannins can impair development of accessory sex glands and by that influence boar taint in entire male pigs (EM). Unknown is whether CT have a similar effects as hydrolysable tannins. Thus, the goal of the study was to investigate the impact of increasing levels of CT from sainfoin on growth performance, carcass characteristics and morphometric organ data of EM. For the experiment, 48 Swiss Large White EM were assigned within litter to 1 of 4 grower (25-60 kg BW) and finisher (60-105 kg BW) diets supplemented with 0 (T0), 5 (T5), 10 (T10) and 15% (T15) sainfoin, respectively. Pigs were reared in one pen equipped with 4 automatic feeders, which allowed to monitor individual daily feed intake. All pigs were weighed weekly. They had *ad libitum* access to feed and water. At 170 d of age, pigs were slaughtered and carcass quality traits were evaluated. The inclusion of CT had no ($p>.05$ effect on growth performance in the grower period. Although feed intake tended ($p=.07$) to be 10.2% greater in T10 than T5, growth rate in the finisher period and feed efficiency in the grower and finisher period were similar among groups. Slaughter weight and hot carcass weight were not affected by the CT supplementation although T0 pigs had a 2.7% greater ($p<.001$) carcass yield than T15 pigs. Due to 6.4% heavier ($p<.05$) ham weights in T5 compared to T10 pigs, total lean cut percentage was 4.4% greater ($p<.05$) in T5 than T10